c.) Amendments to the Claims.

Please amend claims 1 and 5, and add new claims 7-37 as follows, all without prejudice or disclaimer to the subject matter thereof.

Claim 1. (currently amended) A method of determining a presence of a chemical species in a mixture of gasses, comprising:

introducing the mixture of gasses into a sample cell;

irradiating the mixture of gasses in the sample cell with a submillimeter wave that sweeps a predetermined frequency band;

generating a submillimeter spectrum of the mixtures of gasses;

providing a standard submillimeter spectrum of the chemical species that is obtained from the chemical species of a pure form;

selecting a first peak of the standard submillimeter spectrum of the chemical species; ~~and~~

determining whether the selected first peak is present in the generated submillimeter spectrum of the mixture of gasses; and

identifying a component of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until at least one of the first peaks is determined to be present or absent in the corresponding spectrum.

Claim 2. (original) The method of claim 1, further comprising selecting a second peak of the standard submillimeter spectrum of the chemical species when the first peak is present in the submillimeter spectrum, and deciding whether the selected second peak is present in the generated submillimeter spectrum of the mixture of gasses.

Claim 3. (original) The method of claim 1, wherein the first peak is the largest peak in the standard submillimeter spectrum of the mixture of gasses.

Claim 4. (original) The method of claim 1, further comprising determining a quantity of the chemical species in the mixture of gases when the first peak is present in the submillimeter spectrum of the mixture of gasses.

Claim 5. (currently amended) The method of claim 1, ~~further comprising identifying a component of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until at least one of the first peaks is determined to be present in the corresponding spectrum~~ wherein the submillimeter wave is generated by a solid-state oscillator.

Claim 6. (original) The method of claim 1, further comprising identifying components of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until all of the first peaks of the standard submillimeter spectra provided are determined with respect to the presence in the submillimeter spectra of the mixture of gasses.

Claim 7. (new) The method of claim 1, further comprising concentrating the mixture of gasses prior to introducing said mixture into the sample cell.

Claim 8. (new) The method of claim 7, wherein concentrating comprises thermal fractionation.

Claim 9. (new) The method of claim 1, wherein the submillimeter spectrum comprises a series of submillimeter spectra and the first peak comprises a set of peaks such that a peak of said set of peaks corresponds to a spectrum of said series of submillimeter spectra.

Claim 10. (new) The method of claim 1, wherein the sample cell fixes the mixture of gasses.

Claim 11. (new) The method of claim 10, wherein the mixture of gasses is fixed by freezing.

Claim 12. (new) The method of claim 1, wherein the presence of the first peak in the generated submillimeter spectrum is determined by a detector.

Claim 13. (new) The method of claim 12, wherein the detector incorporates an autodyne detection system.

Claim 14. (new) The method of claim 12, wherein the detector incorporates a heterodyne detection system.

Claim 15. (new) The method of claim 12, wherein the detector comprises a heterodyne mixer detector that generates an absorption spectrum of the chemical species.

Claim 16. (new) The method of claim 1, further comprising, applying a clutter avoidance routine in determining whether the selected first peak is present, which considers local distortion of the spectrum at a particular line position, to form a discrete spectra of the chemical species.

Claim 17. (new) The method of claim 1, wherein the clutter avoidance routine forms a discrete spectra of the chemical species.

Claim 18. (new) A method of determining a presence of a chemical species in a mixture of gasses, comprising:

introducing the mixture of gasses into a sample cell;

irradiating the mixture of gasses in the sample cell with a submillimeter wave that sweeps a predetermined frequency band;

generating a submillimeter spectrum of the mixtures of gasses;

providing a standard submillimeter spectrum of the chemical species that is obtained from the chemical species of a pure form;

selecting a first peak of the standard submillimeter spectrum of the chemical species;

determining whether the selected first peak is present in the generated submillimeter spectrum of the mixture of gasses; and

identifying components of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until all of the first peaks of the standard submillimeter spectra provided are determined with respect to the presence in the submillimeter spectra of the mixture of gasses.

Claim 19. (new) The method of claim 18, further comprising selecting a second peak of the standard submillimeter spectrum of the chemical species when the first peak is present in the submillimeter spectrum, and deciding whether the selected second peak is present or absent in the generated submillimeter spectrum of the mixture of gasses.

Claim 20. (new) The method of claim 18, wherein the submillimeter wave is generated by a solid-state exciter and the first peak is selected by an electronic reference system.

Claim 21. (new) The method of claim 18, wherein the submillimeter spectrum comprises a series of submillimeter spectra and the first peak comprises a set of peaks such that a peak of said set of peaks corresponds to a spectrum of said series of submillimeter spectra.

Claim 22. (new) A method for measuring submillimeter absorption comprising:

introducing a gas containing a chemical species of interest into a cell;

heating the cell to a first temperature so that the chemical species evaporates;

leading the evaporated chemical species into a sample cell; and

measuring absorption of the chemical species by:

irradiating the mixture of gasses in the sample cell with a submillimeter wave that sweeps a predetermined frequency band;

generating a submillimeter spectrum of the mixtures of gasses;

providing a standard submillimeter spectrum of the chemical species that is obtained from the chemical species of a pure form;

selecting a first peak of the standard submillimeter spectrum of the chemical species;

determining whether the selected first peak is present in the generated submillimeter spectrum of the mixture of gasses; and

identifying a component of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until at least one of the first peaks is determined to be present or absent in the corresponding spectrum.

Claim 23. (new) The method of claim 22, wherein the sample cell contains multiple separate vacuum segments along an optical path.

Claim 24. (new) The method of claim 23, further comprising adding one or more agents that inhibit interaction between one or more chemical species with the sample to one or more segments of the sample cell.

Claim 25. (new) The method of claim 24, wherein the one or more agents are general inhibitors of chemical interactions or specific inhibitors specifically targeted to inhibit only specific chemical reactions.

Claim 26. (new) The method of claim 22, further comprising digitally processing the absorption measured with a THz module subsystem.

Claim 27. (new) The method of claim 22, further comprising generating a submillimeter incident wave of from 200 to 700 GHz.

Claim 28. (new) The method of claim 22, wherein the submillimeter spectrum comprises a series of submillimeter spectra and the first peak comprises a set of peaks such that a peak of said set of peaks corresponds to a spectrum of said series of submillimeter spectra.

Claim 29. (new) A method for surveying an area for a chemical species comprising:

taking air into a spectrometer at a first location;

receiving global positioning system coordinates at the first location;

measuring a submillimeter absorption spectrum of the air taken in at the first location;

recording the absorption spectrum of the first location with the global positioning system coordinates of the first location;

taking air into a second location of the spectrometer;

receiving global positioning system coordinates at the second location;

measuring a submillimeter absorption spectrum of the air taken in at the second location; and

recording the absorption spectrum of the second location with the global positioning system coordinates of the second location:

wherein measuring the submillimeter absorption spectrum of the air at the first or second location comprises:

irradiating the mixture of gasses in the air with a submillimeter wave that sweeps a predetermined frequency band;

generating a submillimeter spectrum of the mixtures of gasses;

providing a standard submillimeter spectrum of the chemical species that is obtained from the chemical species of a pure form;

selecting a first peak of the standard submillimeter spectrum of the chemical species;

determining whether the selected first peak is present in the generated submillimeter spectrum of the mixture of gasses; and

identifying a component of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species and determining the presence of the first peaks of the corresponding standard submillimeter spectra until at least one of the first peaks is determined to be present in the corresponding spectrum.

Claim 30. (new) The method of claim 29, wherein the submillimeter spectrum comprises a series of submillimeter spectra and the first peak comprises a set of peaks such that a peak of said set of peaks corresponds to a spectrum of said series of submillimeter spectra.

Claim 31. (new) A spectrometer for determining a presence of a chemical species in a mixture of gasses, which comprises:

a sample cell for introducing the mixture of gasses;

a solid state exciter for irradiating the mixture of gasses in the sample cell with a submillimeter wave that sweeps a predetermined frequency band;

a frequency marker generating unit for generating a submillimeter spectrum of the mixtures of gasses;

a solid state detector for detecting the submillimeter spectrum of mixtures of gasses;

a diagnostic protocol that:

compares the submillimeter spectrum detected with a standard submillimeter spectrum of the chemical species that is obtained from the chemical species of a pure form;

selects a first peak of the standard submillimeter spectrum of the chemical species;

determines whether the selected first peak is present in the generated submillimeter spectrum of the mixture of gasses;

identifies a component of the mixture of gasses by providing additional standard submillimeter spectra of other chemical species; and

determines the presence of the first peaks of the corresponding standard submillimeter spectra until at least one of the first peaks is determined to be present in the corresponding spectrum.

Claim 32. (new) The spectrometer of claim 31, wherein the sample cell has a length that is proportional to the path length of the chemical species.

Claim 33. (new) The spectrometer of claim 31, wherein the sample cell contains an absorbent material that absorbs the chemical species.

Claim 34. (new) The spectrometer of claim 31, which has a dimension of about one square foot, and a weight of less than about 50 kg.

Claim 35. (new) The spectrometer of claim 31, further comprising a Schottky diode or a heterodyne mixer detector.

Claim 36. (new) The spectrometer of claim 31, further comprising an electronic frequency management system.

Claim 37. (new) The spectrometer of claim 36, wherein the electronic frequency management system reduces noise and increases sensitivity.